

LORAIN HARBOR, OHIO

LETTER

FROM

THE SECRETARY OF WAR

TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, UNITED STATES ARMY, DATED JANUARY 22, 1941, SUBMITTING A REPORT, TOGETHER WITH ACCOMPANYING PAPERS AND AN ILLUSTRATION, ON REEXAMINATION OF LORAIN HARBOR, OHIO, REQUESTED BY RESOLUTION OF THE COMMITTEE ON RIVERS AND HARBORS, HOUSE OF REPRESENTATIVES, ADOPTED OCTOBER 24, 1939

APRIL 1, 1941.—Referred to the Committee on Rivers and Harbors and ordered to be printed, with an illustration

WAR DEPARTMENT,
Washington, March 26, 1941.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

DEAR MR. SPEAKER: I am transmitting herewith a report dated January 22, 1941, from the Chief of Engineers, United States Army, on reexamination of Lorain Harbor, Ohio, requested by resolution of the Committee on Rivers and Harbors, House of Representatives, adopted October 24, 1939, together with accompanying papers and illustration.

The Bureau of the Budget has been consulted and advises that authorization of the project recommended by the Chief of Engineers would not be in accord with the program of the President at this time.

Sincerely yours,

HENRY L. STIMSON,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 22, 1941.

The CHAIRMAN, COMMITTEE ON RIVERS AND HARBORS,
House of Representatives, Washington, D. C.

MY DEAR MR. CHAIRMAN: 1. The Committee on Rivers and Harbors of the House of Representatives, by resolution adopted October 24, 1939, requested the Board of Engineers for Rivers and Harbors to review the reports on Lorain Harbor, Ohio, submitted in River and Harbor Committee Document No. 51, Seventy-fourth Congress, first session, and previous reports, with a view to determining whether it is advisable to modify the existing project in any way at this time. I enclose the report of the Board in response thereto.

2. After full consideration of the reports secured from the district and division engineers, the Board recommends modification of the existing project for Lorain Harbor, Ohio, to provide for a turning basin 20 feet deep in the bend of the Black River immediately upstream from the Baltimore & Ohio Railroad Co.'s dock, substantially as shown on the accompanying map, at an estimated first cost of \$30,000 with \$1,500 annually for maintenance in addition to the amount now required; subject to the provision that local interests furnish without cost to the United States necessary lands, easements, and rights-of-way and spoil disposal areas for new work and maintenance when and as required, and hold and save the United States free from all claims for damages incident to the construction and subsequent maintenance of the improvement.

3. After due consideration of these reports, I concur in the views and recommendations of the Board.

Very truly yours,

J. L. SCHLEY,
*Major General,
Chief of Engineers.*

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

WAR DEPARTMENT,
THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., December 2, 1940.

Subject: Lorain Harbor, Ohio.

To: The Chief of Engineers, United States Army.

1. This report is in response to the following resolution adopted October 24, 1939:

Resolved by the Committee on Rivers and Harbors of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the reports on Lorain Harbor, Ohio, submitted in River and Harbor Committee Document Numbered 51, Seventy-fourth Congress, first session, and previous reports, with a view to determining whether it is advisable to modify the existing project in any way at this time.

2. Lorain Harbor, Ohio, is on the south shore of Lake Erie at the mouth of the Black River 28 miles west of Cleveland and 72 miles east of Toledo. The improvement authorized by Congress provides for (a) an outer harbor about 60 acres in area formed by converging

rubble-mound breakwaters with an aggregate length of 6,350 feet and having an entrance 500 feet wide; (b) two piers at the mouth of the river 300 feet apart; (c) a depth of 25 feet in soft material and 26 feet in hard material in the outer harbor and in the river channel to a point 2,200 feet upstream from the outer ends of the piers, thence 24 feet deep in soft material and 25 feet in hard material to a turning basin 17 feet deep and 3 miles above the entrance to the river; and (d) an approach channel 16 feet deep in the outer harbor to the municipal pier west of the mouth of Black River. The project is 95 percent completed. Costs of permanent work from 1828 to April 30, 1940, have been \$2,693,525 for new work and \$474,600 for maintenance. The latest approved estimate of annual cost for maintenance is \$43,000. The cost to local interests in providing necessary lands and in constructing bulkheads and other facilities is reported to have totaled \$1,265,000.

3. Lorain County with a population of 100,000 is an agricultural section containing several small industrial cities. The cities of Lorain and Elyria with populations of 44,500 and 25,600, respectively, are located on the waterway within 5 miles of each other and the principal products are unfinished steel products, ships, excavating machinery, cranes, stoves, furnaces, boilers, conveyors, ice machines, rails, pipes and other finished iron and steel products. The area has excellent rail and highway facilities. Commerce of the harbor during the past decade varied between a low of 1,819,000 tons in 1932 and a peak of 6,174,000 tons in 1939. During the latter year it consisted principally of iron ore, coal, stone, oil, sand and miscellaneous products, carried in a total of 700 trips of steamers, motor vessels, and barges drawing 12 to 22 feet and 1,850 drawing less than 12 feet.

4. Local interests request extension of the east breakwater and construction of a shore arm to afford protection for boats during storms, provide a mooring basin for idle boats, and protect the shore from erosion. They also request the construction of a bulkhead to connect the inner end of the east river pier with the shore to replace the deteriorated city bulkhead. The Baltimore & Ohio Railroad requests dredging in the Black River above its coal loading dock to provide sufficient width for turning vessels. No offer of local cooperation is made by the railroad, but the city of Lorain has agreed to furnish, free of cost to the United States, the property adjacent to the Coast Guard station in front of the proposed bulkhead.

5. The district engineer reports that the harbor now has adequate mooring facilities to meet the present and reasonably prospective needs of general navigation and that at no time during the navigation or winter seasons have the existing facilities been used to capacity. An extension of the east breakwater would cost in excess of \$3,000,000 and as it would be of no material benefit to navigation it cannot be economically justified. The construction of a bulkhead at an estimated cost of \$84,175 would relieve the city of the responsibility for removing its old dock as it becomes a menace to navigation, but it would be of no appreciable benefit to general navigation and is therefore not justified. The district engineer estimates the initial cost of widening the bend above the Baltimore & Ohio Railroad's coal dock at \$30,000 with annual carrying charges of \$2,800. This would materially aid vessels in turning and loading and would afford increased safety and convenience to 110 vessels carrying 1,000,000 tons of commerce

annually. He concludes that this part of the improvement is economically justified and he recommends it, subject to certain provisions of local cooperation. The division engineer concurs.

6. Local interests were advised of the partially adverse conclusions of the division engineer and were requested to submit additional data to the Board. No communications have been received.

VIEWES AND RECOMMENDATIONS OF THE BOARD OF ENGINEERS FOR
RIVERS AND HARBORS

7. The Board concurs in the view that additional mooring facilities are not needed at this time as the existing facilities are not used to capacity and that the construction of a new bulkhead will effect no general benefits to commerce. The Board therefore concludes that these improvements are not economically justified. Widening of the bend above the Baltimore & Ohio Railroad's coal dock will permit large vessels that receive or discharge their cargo in the lower river to turn around without having to proceed to the shallow basin at the head of the project and will be of sufficient benefit to general navigation to justify the required expenditure. The Board therefore recommends modification of the existing project for Lorain Harbor, Ohio, to provide for a turning basin 20 feet deep in the bend of the Black River immediately upstream from the Baltimore & Ohio Railroad Co.'s dock, substantially as shown on the accompanying map, at an estimated first cost of \$30,000 with \$1,500 annually for maintenance in addition to the amount now required; subject to the provision that local interests furnish without cost to the United States necessary lands, easements, and rights-of-way and spoil disposal areas for new work and maintenance when and as required, and hold and save the United States free from all claims for damages incident to the construction and subsequent maintenance of the improvement.

For the Board:

THOMAS M. ROBINS,
Brigadier General, Corps of Engineers,
Senior Member.

REEXAMINATION OF LORAIN HARBOR, OHIO

SYLLABUS

Local interests request the extension of the east breakwater at Lorain Harbor, Ohio, to increase outer harbor mooring facilities and protect the adjacent shore from erosion, the construction of a bulkhead along the east bank of the Black River from the inner end of the east river pier to the Coast Guard station, and the widening of the river channel at the bend just above the Baltimore & Ohio Railroad Co.'s coal dock to facilitate turning of vessels. The district engineer finds that the mooring facilities of the harbor are adequate for present and reasonably prospective needs of lake carriers and that the construction of the requested bulkhead would be of little benefit to navigation. Further, he concludes that in the interest of safety and convenience to established navigation, the desired widening of the river channel is justified at this time, and recommends that the existing project at Lorain Harbor, Ohio, be modified to provide for widening the channel in the bend of the Black River immediately upstream from the Baltimore & Ohio Railroad Co.'s coal dock to a width of about 650 feet and a depth of 20 feet at an estimated first cost of \$30,000 and \$1,500 annually for maintenance thereafter in addition to that now authorized.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,*Buffalo, N. Y., August 10, 1940.*

Subject: Review of reports on Lorain Harbor, Ohio.

To: The Division Engineer, Great Lakes Division, Cleveland, Ohio.

AUTHORITY

1. This report is submitted in compliance with the following resolution dated October 24, 1939:

Resolved by the Committee on Rivers and Harbors of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors created under section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the reports on Lorain Harbor, Ohio, submitted in River and Harbor Committee Document Numbered 51, Seventy-fourth Congress, first session, and previous reports, with a view to determining whether it is advisable to modify the existing project in any way at this time.

NATURE OF REPORTS BEING REVIEWED

2. The principal reports being reviewed were all adopted by Congress in the River and Harbor Act of August 30, 1935, and are:

(a) A review of reports contained in House Document No. 51, Seventy-fourth Congress, first session, dated May 29, 1935, recommending that the existing project be modified by deepening the outer harbor and the lower 2,200 feet of the river channel to 25 feet in soft material and 26 feet in hard material corresponding to depths prevailing in the down-bound channels of the Great Lakes, thence the river channel to the upper end of the National Tube Co.'s dock to 24 feet in soft material and 25 feet in hard material, and a turning basin to 17 feet opposite said dock, subject to the conditions that local interests furnish, free of cost to the United States, satisfactory disposal areas for dredged material and all lands or easements that may be necessary and construct satisfactory bulkheads along the river channel.

(b) A review of reports published as Senate Committee Print, Seventy-third Congress, second session, dated June 8, 1934, recommending modification of the existing project to provide for an entrance channel 16 feet deep in the west outer harbor to the municipal pier, provided local interests furnish evidence satisfactory to the Secretary of War that they secure a railroad connection to the pier and dredge a suitable slip at the pier. The slip has been dredged.

(c) A preliminary examination and survey report contained in House Document No. 469, Seventy-second Congress, second session, dated July 25, 1932, recommending that the existing project be modified to provide for deepening the Federal project area to 25 feet in soft material and 26 feet in hard material, providing local interests improve and maintain the Black River to the same depth from the upper limit of the Federal project to the upper end of the National Tube Co.'s dock, and that the first two bends and the winding basin be widened, subject to the condition that local interests provide without cost to the United States all necessary easements, rights-of-way, and spoil-disposal areas. The recommended depths of 25 feet in soft material and 26 feet in hard material for Black River were, before adoption by Congress, modified by a review of reports as described in paragraph 2 (a) preceding, as it was determined that the existing fleet of lake boats could not load to drafts requiring the greater depths.

DESCRIPTION

3. Lorain Harbor, Ohio, is located at the mouth of the Black River on the south shore of Lake Erie about 28 miles westerly from Cleveland, Ohio, and 72 miles easterly of Toledo, Ohio. The harbor includes the lower 3 miles of the Black River with widths varying from

160 to 450 feet, an outer harbor formed by converging rubble-mound breakwaters having an aggregate length of 6,350 feet, and has a total area of about 150 acres.

4. The two branches of the Black River have their sources in the northern part of Ashland County and in the western part of Medina County, respectively, flow in a northerly direction, and unite to form the Black River at Elyria. Thence the Black River flows north-northwest for about 16 miles to Lorain, discharging into Lake Erie. The drainage area is approximately 550 square miles, discharge records therefor are not available.

5. Depths are referred to low-water datum for Lake Erie, 570.5 feet above mean tide at New York City. Since 1900, the monthly mean level of Lake Erie has fluctuated from a high of 3.77 feet above to a low of 1.07 feet below that plane. The greatest annual monthly mean fluctuation has been 2.50 feet and the least 0.90 foot. Extreme variations in water level at Lorain Harbor due to storms and other causes have been from about 5.5 feet above to 2.0 feet below low water datum.

6. The controlling depth from deep water in Lake Erie through the outer harbor to a point in the river channel 2,200 feet upstream from the outer ends of the river piers is 25 feet, thence 24 feet for $2\frac{1}{4}$ miles to the head of navigation. A turning basin with a depth of 17 feet is provided at the head of navigation. The approach channel to the municipal pier in the outer harbor has a controlling depth of 16 feet.

7. The table below shows the project depths in the Great Lakes Connecting Channels:

Channel:	Project depth in feet
Westward of Lake Erie, up-bound.....	21
Westward of Lake Erie, down-bound.....	25
St. Marys Falls Canal connecting Lakes Superior and Huron.....	24
Welland Canal connecting Lakes Erie and Ontario.....	25
New York State Barge Canal.....	¹ 12
St. Lawrence River Canals.....	14

¹ The work of deepening the New York State Barge Canal between Oswego and the Hudson River to 14 feet between locks will be completed in 1943.

8. The general locality is shown on United States Lake Survey charts Nos. 3, 35, and 357, and on the map accompanying this report.

TRIBUTARY AREA

9. The tributary area includes the larger part of Lorain County, Ohio, has a population of about 100,000, is primarily agricultural, and contains 15 cities, small towns, and villages. The two largest cities, Lorain and Elyria, are primarily industrial, have populations of about 44,500 and 25,600 respectively, are within 5 miles of each other, and must be considered collectively as the commercial area serving Lorain Harbor. Lorain has three building and loan associations with resources of \$1,447,000, four banks with resources of \$9,184,000, and its assessed valuation is \$74,572,000. Elyria also has three building and loan associations with resources of \$967,000, three banks with resources of \$14,107,000, and its assessed valuation is \$41,700,000.

10. Among the larger industries located at Lorain and Elyria are the steel plant of the National Tube Co., the shipbuilding and dry-dock plant of the American Shipbuilding Co., the coal and ore docks

of the Baltimore & Ohio Railroad Co., the stove plant of the National Stove Co., and the clothing plant of Richman Bros. The diversity of products include unfinished steel products, ships, excavating machinery, cranes, stoves, furnaces, boilers, conveyors, ice machines, rails, pipes, bars and other finished steel and iron items, clothing, brass castings, and bearing and babbitt metals.

11. Lorain is located on Route U S 6, a main highway between Cleveland and Toledo, and is connected by improved highways with communities throughout the tributary area. The Baltimore & Ohio Railroad Co. owns property on the west bank of the Black River with an ore and sand unloading dock near the mouth of the river and a coal loading dock about $1\frac{3}{4}$ miles above the mouth of the river. The New York, Chicago & St. Louis Railroad has access to the waterfront by switching connections with the Baltimore & Ohio Railroad. Elyria, located 13 miles inland from the harbor, is on the main line of the New York Central Railroad, United States highway No. 20, and is also connected by improved highways with communities throughout the area.

BRIDGES

12. Data on bridges crossing the Black River within the limits of the existing project and requested improvements are given in the table below:

Bridges

Name	Miles above river mouth	Built under War Department permit	Date constructed	Kind
1. Erie Ave. (to be removed).....	0.6	Yes.....	1900.....	Highway.
2. Erie Ave. (to replace above bridge).....	0.6	Yes.....	Under construction.	Do.
3. New York, Chicago & St. L. R. R.....	1.2	Yes.....	(2).....	Railroad.
4. 21st St.....	1.9	Yes.....	Under construction.	Highway.

Name	Horizontal clearance	Vertical clearance		Remarks
		In position	Raised	
	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	
1. Erie Ave. (to be removed).....	116	26	-----	Swing bridge.
2. Erie Ave. (to replace above bridge).....	130	21	97.7	Double leaf lift bridge. To be completed in 1940.
3. New York, Chicago & St. L. R. R.....	116	35	-----	Swing bridge.
4. 21st St.....	206	97.7	-----	Fixed type. To be completed in 1940.

¹ Normal to channel at elevation 668.2, which is 97.7 feet above low-water datum.

² Date of construction unknown. Approved by War Department in 1902.

PRIOR REPORTS

13. The only prior reports written on Lorain Harbor within the past 8 years are the reports described in paragraph 2. The preliminary examination and survey report published in 1932 as House Document Numbered 469, Seventy-second Congress, second session, contains a list of all reports prior to that date.

EXISTING PROJECT

14. The original project for Lorain Harbor, Ohio (then known as Black River Harbor, Ohio), was adopted by the River and Harbor Act of May 23, 1828. Under this and subsequent authorization parallel piers extending into the lake were constructed and dredging undertaken between the piers. The cost of the completed project from 1828 to 1835, inclusive, was \$45,134.77. By 1839 the shore line had advanced so that the piers extended only about 800 feet into the lake. The controlling depth in the entrance channel was 9.5 feet with 14 feet near the outer end of the piers. Appropriations made for this harbor from 1836 to 1872, inclusive, totaled \$73,070, and were used for repairs and extensions to the piers and for dredging between the piers to the lake.

15. The existing project adopted by the River and Harbor Act of March 3, 1899, as last modified by the River and Harbor Act of August 30, 1935, provides for the following:

(a) An outer harbor of about 60 acres in area formed by converging rubble-mound breakwaters with an aggregate length of 6,350 feet and having an entrance 500 feet wide between pierheads of timber cribs with concrete superstructure located at the outer ends of the breakwaters.

(b) Two piers at the mouth of the river 300 feet apart, the west pier of timber cribs with concrete superstructure 1,003 feet long, and the east pier 1,875 feet long, of which 1,763 feet is of timber cribs with concrete superstructure and 112 feet is of sheet pile construction.

(c) A depth of 25 feet in soft material and 26 feet in hard material in the outer harbor and the river channel to a point 2,200 feet upstream from the outer ends of the piers, thence 24 feet deep in soft material and 25 feet in hard material to the upper end of the American Shipbuilding Co. drydock No. 2; thence for a channel of the same depths and generally 200 feet wide suitably widened at the bends, to the upper end of the National Tube Co.'s dock, with an enlarged turning basin 17 feet deep opposite said dock; no project dredging above drydock No. 2 to be closer than 50 feet to existing and future docks or bulkheads.

(d) An approach channel 16 feet deep extending from the outer harbor to the municipal pier.

16. The existing project is 95 percent completed. Deepening the channel through the outer harbor, the river channel and turning basin to project depths was completed in 1938. Deepening the remaining portion of the outer harbor and widening the river channel in the vicinity of Erie Avenue remain to be done to complete the project.

17. The cost of the work done by the Federal Government at Lorain Harbor to April 30, 1940, is shown below:

Item	New work	Maintenance	Total
Previous project.....	\$292,202.88		\$292,202.88
Existing project.....	¹ 2,401,322.35	² \$474,599.11	2,875,921.46
Total.....			3,168,124.34

¹ Includes \$165,000 Public Works funds.

² Includes \$76,300 Public Works funds.

The average annual maintenance cost for the last 5 years has been \$40,229 and is less than the latest approved estimate of \$43,000 which is considered adequate for the maintenance of the project as now authorized. No modifications of the existing project are pending before Congress.

LOCAL COOPERATION

18. The city of Lorain and other local interests have made contributions toward the Federal improvement at Lorain Harbor as follows:

(a) The River and Harbor Act of August 8, 1917, required the city of Lorain to contribute \$3,000 toward the cost of extending the west breakwater shoreward. This contribution was made.

(b) The River and Harbor Act of July 3, 1930, required local interests to furnish without cost to the United States all land necessary for widening the river at the bend just above the Erie Avenue Bridge. This requirement was complied with.

(c) The River and Harbor Act of August 30, 1935, required local interests to provide, free of cost to the United States, satisfactory disposal areas for dredged material, and all lands and easements that may be necessary in securing and maintaining the channel dimensions, install satisfactory bulkheads along the river, and furnish evidence satisfactory to the Secretary of War that they will secure railroad connection to the municipal pier and dredge a suitable slip at the pier. These conditions have been complied with but as yet the rail connection has not been made.

The cost of river improvements to date to the city of Lorain, including the cost of meeting the above conditions, has been about \$1,265,000.

OTHER IMPROVEMENTS

19. In order to insure the location of a steel plant on the present site occupied by the National Tube Co., the city of Lorain agreed on April 3, 1894, to furnish and maintain a navigable channel to the plant when built. At that time vessels entering the harbor required depths of 17 feet (River and Harbor Act of July 13, 1892). The agreement was kept by the city up to 1934, during which time the project depth had increased to 20 feet, except in the west side of the turning basin where it was 17 feet. The channel so built and maintained was in the Black River from the American Shipbuilding Co.'s drydock No. 2 to and including the turning basin opposite the dock of the National Tube Co., a distance of about $2\frac{1}{4}$ miles. The city of Lorain expended about \$875,000 doing this work, which, together with interest on bonds, has amounted to nearly \$1,646,000. The National Tube Co. enlarged the turning basin in 1904, the cost of which is not known.

TERMINAL AND TRANSFER FACILITIES

20. A municipal dock having an approach channel 16 feet deep, but no rail connections, is located in the outer harbor west of the river mouth. Another municipal dock, unsafe for general use because of decay, is located on the east side of the river between the Erie Avenue Bridge and the east pier. This latter city dock is at the location of the bulkhead desired by local interests described in paragraph 23 (b). Both docks are open to the public.

21. Private terminal improvements include one iron ore and one coal terminal, dock space leased by Kelley Island Lime & Transport Co., and dock space for storage of other commodities, with modern loading and unloading equipment all owned by the Baltimore & Ohio Railroad Co. and open to the public on equal terms; the extensive docks of the National Tube Co. with modern equipment for handling iron ore, limestone, and sand, not open to the public; one privately owned sand and gravel dock equipped with cranes, open to the public; two privately owned fish docks with restricted use; and two drydocks of the American Shipbuilding Co. with facilities for building and repairing all types of lake vessels. All these docks have rail connections.

22. The owners of the water frontage on the outer harbor west of the river are as follows: Ohio Public Service Corporation, Lorain Crystal Ice Co., Baltimore & Ohio Railroad Co., and the city of Lorain. Of this aggregate frontage of about 2,000 linear feet only approximately 350 feet is developed. The frontage on the improved section of the river is owned by the following: United States Coast Guard, city of Lorain, Baltimore & Ohio Railroad Co., Lake Erie & Pittsburgh Railroad Co., National Tube Co., Lillie M. Stone, Frank A. Sarstedt, and the American Shipbuilding Co. The aggregate frontage is approximately 30,000 linear feet with about 8,000 linear feet developed.

IMPROVEMENTS DESIRED

23. A public hearing was held by the district engineer on December 5, 1939, at Lorain, Ohio. Representatives of the county and city governments, various railroads, industries, and boat interests, and individual interested parties were present. The city of Lorain requested that the existing project be modified as follows:

(a) Extension of the east breakwater eastward for a distance of approximately 7,000 feet parallel with and approximately 2,000 feet from the shore line, thence a shore arm extending to the shore line at a point 2,000 feet east of the east line of Century Park, with a gap near the outer end of the shore arm sufficiently wide to permit the entrance and departure of vessels having a draft not exceeding about 18 feet.

(b) Construction of 455 feet of bulkhead on the east side of the river from the United States Coast Guard property to the inner end of the present east pier.

The Baltimore & Ohio Railroad Co. requested modification of the existing project as follows:

(c) Dredging of the Black River at the bend immediately above their coal loading dock to provide sufficient width for the winding of vessels.

24. No cooperation was offered by the Baltimore & Ohio Railroad; however, the city of Lorain has agreed to deed to the United States the property adjacent to the Coast Guard station and in front of which it is requested that the bulkhead be built.

25. Local interests gave the following reasons in justification of the requested modification:

(a) The breakwater extension including a shore arm would provide:

(1) Protection for boats during a storm.

(2) A mooring basin for boats not in active service, thus facilitating the passage of vessels navigating the Black River.

(3) A basin to moor boats during the spring dredging of the river.

(4) Protection of the shore in the vicinity of Lakeside Avenue from erosion.

(b) Construction of a bulkhead adjacent to the east pier would:

(1) Eliminate the old rapidly deteriorating city bulkhead and dock now located on the site, thus reducing navigation hazards and maintenance dredging.

(2) Provide the Federal Government with an improved continuous section of river-front property extending from the east pier to the Coast Guard station.

(c) Widening of the river bend immediately above the Baltimore & Ohio Railroad coal dock: (1) Would facilitate the turning of vessels at this point, particularly of partially loaded boats coming from other ports to the Baltimore & Ohio Railroad coal dock to complete their cargo.

COMMERCE

26. *Present.*—Statistics on the water-borne commerce of Lorain Harbor for the period 1930–39, inclusive, are given in the following table:

Year	Receipts	Shipments	Total
	<i>Tons</i>	<i>Tons</i>	<i>Tons</i>
1930.....	3,585,376	2,028,358	5,613,734
1931.....	2,334,485	1,468,303	3,802,788
1932.....	838,444	980,994	1,819,438
1933.....	2,897,528	1,142,564	4,040,092
1934.....	2,755,124	1,088,274	3,843,398
1935.....	2,735,457	1,245,562	3,981,019
1936.....	3,590,028	1,450,527	5,040,555
1937.....	5,151,041	1,551,813	6,702,854
1938.....	2,605,788	857,653	3,463,441
1939.....	4,842,650	1,331,197	6,173,847
10-year average.....	3,133,592	1,314,524	4,448,117

During the past 10 years iron ore receipts and coal shipments have comprised approximately 87 percent of the total water-borne commerce of Lorain Harbor. The magnitude of the movement of each depends on the general economic condition and follows no definite trend. A flow chart ¹ showing the commercial tonnage handled in the harbor for the shipping season of 1939 accompanies this report.

¹ Not printed.

27. The classification of commerce for the calendar year 1939 follows:

Class and type	Material	Tons
General vessel traffic:		
(a) Canadian imports	Sand ¹	28, 739
(b) Canadian exports	Coal, bituminous	47, 851
	Ores, manufactured steel	24, 911
(c) Lakewise receipts	Agricultural meal	11, 686
	Coke	30, 595
	Gravel	3, 929
	Oil, fuel	36, 939
	Stone	650, 030
	Ores:	
	Iron and steel scrap	9, 412
	Iron ore	4, 036, 829
	Pig iron	11, 006
	Steel	80
(d) Lakewise shipments	Coal:	
	Bituminous	1, 083, 559
	Bunker	71, 345
	Oil, bunker	389
	Ores:	
	Steel	7, 089
	Steel billets	96, 053
(e) Local receipts	Fish, fresh	385
	Sand	23, 020
Grand total, all traffic		6, 173, 847

¹ Dredged in Canadian waters.

28. The Toledo, Lorain & Fairport Dock Co. operates the Baltimore & Ohio Railroad Co.'s coal dock. The coal received at this dock originates in the mines of Ohio and West Virginia, and is shipped westerly to many ports on the upper lakes as well as easterly to Canadian ports on Lake Ontario and the St. Lawrence River.

29. Statistics on the water-borne commerce handled over the Baltimore & Ohio coal dock for the period 1930-39, inclusive, follow:

Year	Shipments		
	Cargo coal	Bunker coal	Total
	<i>Tons</i>	<i>Tons</i>	<i>Tons</i>
1930	1, 890, 475	99, 441	1, 989, 916
1931	1, 415, 383	34, 845	1, 450, 228
1932	945, 604	21, 144	966, 748
1933	1, 075, 568	55, 568	1, 131, 136
1934	1, 004, 333	70, 008	1, 074, 341
1935	1, 150, 658	64, 897	1, 215, 555
1936	1, 339, 685	66, 751	1, 406, 436
1937	1, 357, 530	107, 014	1, 464, 544
1938	746, 963	42, 918	789, 881
1939	1, 131, 410	71, 345	1, 202, 755
10-year average	1, 205, 760	63, 393	1, 269, 154

30. *Prospective.*—The water-borne commerce at Lorain Harbor, Ohio, will continue to consist principally of coal and iron ore and its volume will in general follow the economic trend. The completion of the replacement of the Erie Avenue Bridge by about the end of 1940 will permit the removal of a hazard to navigation that should have a stimulating effect.

VESSEL TRAFFIC

31. The number, character, and draft of vessels arriving and clearing at the port of Lorain during the calendar year 1939 are shown in the following table:

IN-BOUND ¹

Draft	Steamers	Motor vessels	Small gas	Barges	Total
21 to 22 feet.....	32	-----	-----	-----	32
20 to 21 feet.....	257	-----	-----	-----	257
18 to 20 feet.....	119	-----	-----	3	122
16 to 18 feet.....	57	-----	-----	-----	57
14 to 16 feet.....	166	5	-----	-----	171
12 to 14 feet.....	48	17	-----	-----	65
Less than 12 feet.....	107	6	1,723	17	1,853
Total.....	786	28	1,723	20	2,557
Total net registered tonnage.....	2,965,988	27,765	8,880	38,903	3,041,536

OUT-BOUND ¹

Draft	Steamers	Motor vessels	Small gas	Barges	Total
21 to 22 feet.....	2	-----	-----	-----	2
20 to 21 feet.....	132	-----	-----	-----	132
18 to 20 feet.....	413	15	-----	6	434
16 to 18 feet.....	44	8	-----	3	55
14 to 16 feet.....	24	2	-----	-----	26
12 to 14 feet.....	164	2	1,723	11	1,900
Less than 12 feet.....	-----	-----	-----	-----	-----
Total.....	779	27	1,723	20	2,549
Total net registered tonnage.....	2,914,753	25,770	8,880	38,903	2,988,306

¹ Includes vessels of foreign registry as follows: Steamers, 23, net registered tonnage 24,073 tons.

32. Boats navigating the upper 2 miles of the Black River are bound for either the National Tube Co.'s dock or the Baltimore & Ohio Railroad Co.'s coal dock. The following table shows the number and type of boats arriving at the Baltimore & Ohio Railroad Co.'s coal dock during the period 1931 to 1939, inclusive, for either cargo or fuel. No statistics are available prior to 1931.

Year	Steamboats	Barges	Tugs ¹	Miscellaneous	Total boats
1931.....	228	-----	-----	-----	228
1932.....	152	4	-----	-----	156
1933.....	180	43	-----	-----	223
1934.....	158	58	-----	-----	216
1935.....	185	52	-----	-----	237
1936.....	203	49	-----	-----	252
1937.....	222	123	2 6	2 2	353
1938.....	115	57	2 18	2 20	210
1939.....	165	82	3 4	-----	251
Average for 9 years.....	179	52	-----	-----	236

¹ Does not include the arrival of harbor tugs nor tugs towing barges and not fueling.

² Contractor's plant during contract period only.

³ Tugs used in towing barges.

33. Statistics indicate the year 1939 to be a typical or average year for tonnage and vessel traffic. Data on vessels arriving at the Baltimore & Ohio Railroad Co.'s coal dock during 1939 follows:

Arrival	Number of steamboats		Number of barges and tugs	Total	Draft on arrival
	450 feet or over	Under 450 feet			
Light.....	1 105	58	80	243	12 to 16 feet.
Partly loaded.....	2 6	2	-----	8	16 to 19 feet 8 inches.

¹ Includes 44 self-unloaders, 6 self-unloading barges.

² Includes 3 self-unloaders.

34. The number of boats moored in Lorain Harbor for the winter periods 1930 to 1940, inclusive, is as follows:

Winter of—	Number of—		Winter of—	Number of—	
	Steam-boats	Barges		Steam-boats	Barges
1930-1931.....	17	4	1936-1937.....	29	-----
1931-1932.....	(1)	(1)	1937-1938.....	23	-----
1932-1933.....	21	2	1938-1939.....	14	2
1933-1934.....	18	-----	1939-1940.....	23	1
1934-1935.....	19	-----			
1935-1936.....	20	-----	Average.....	20	-----

¹ Not available.

All of these were moored in the Black River, as vessel owners prefer mooring in the river because of economy, more secure shelter, and accessibility.

DIFFICULTIES ATTENDING NAVIGATION

35. A protruding abutment of the present Erie Avenue Bridge is a hazard to navigation; however, this will be eliminated upon the completion of the new bridge now under construction, and the horizontal clearance will be increased from 116 feet to 130 feet.

36. The Black River contains six bends between its mouth and the turning basin at the head of navigation, a distance of 3 miles, which make the navigation of its channel difficult. Most boats navigating the river require the use of one tug; barges, two. River navigation is particularly hazardous during high winds, even though tugs are used.

37. Vessels loading at the Baltimore & Ohio coal dock located $1\frac{1}{4}$ miles below the head of navigation, save approximately 2 hours by turning in the bend immediately above this dock rather than in the turning basin at the head of navigation. The project channel width at this bend is 450 feet, the project depth 24 feet, and a depth of 20 feet is available over an additional width of 60 feet. As about 60 percent of the freighters visiting this dock are 450 feet or over in length, turning is difficult. Further, vessels arriving with part cargo, of which there were six in 1939, must turn at this point due to the limiting depth in the turning basin at the head of navigation.

SURVEY

38. No physical survey of Lorain Harbor was made, as the necessary information was available. This information is shown on the map entitled "Lorain Harbor, Ohio," dated January 30, 1940, accompanying this report.

PLAN OF IMPROVEMENT

39. The plan to provide for the requested modification of the existing project is as shown on the enclosed map and is described as follows:

(a) Construct an easterly extension of about 7,000 feet to the present east breakwater, parallel with and approximately 2,000 feet from the shore line, thence to meet the shore at a point 2,000 feet east of the east line of Century Park, leaving a gap near the outer end of the shore extension of sufficient width to allow the passage of vessels.

(b) Construct about 455 feet of bulkhead on the east side of the river between the inner end of the east pier and the bulkhead in front of the United States Coast Guard property.

(c) Dredge the bend in the Black River immediately above the Baltimore & Ohio coal dock to a depth of 20 feet, with 1 foot over-depth, to provide sufficient width for the free winding of vessels.

40. The estimated first costs of the desired improvements including 14 percent for engineering, overhead, and contingencies, are as follows:

Estimated first costs of desired improvements

Item	Quantity	Unit cost	Cost
Construction:			
Rubble-mound breakwater:	<i>Linear feet</i>		
Easterly extension	7,000	\$410.00	\$2,870,000
Shore arm	2,400	212.50	510,000
Steel sheet pile cellular-type river bulkhead	455	185.00	84,175
Total cost of construction, approximately			\$3,464,000
Dredging turning basin at Baltimore & Ohio dock	<i>Cubic yards</i> 30,000	1.00	30,000
Total cost of dredging, approximately			30,000
Total first cost of desired improvements, approximately			3,494,000

AIDS TO NAVIGATION

41. The existing aids to navigation are considered adequate for the existing project. Additional aids would be necessary with construction of the desired breakwater at an estimated cost of \$1,200.

ANALYSIS OF ECONOMIC JUSTIFICATION OF PROPOSED IMPROVEMENTS.

42. The economic analysis of the proposed improvements follows:

Investment costs and annual charges

Item	East break-water extension and shore arm	River bulkhead	Turning basin
(a) Investment costs:			
(1) Federal investment:			
(a) First cost to Engineer Department	\$3,380,000	\$84,000	\$30,000
(b) First cost to Coast Guard (navigation aids)	1,200	None	None
Total Federal first cost	3,381,000	84,000	30,000
(c) Interest during construction 3 percent $\times \frac{1}{2} \times 2$ years	101,000	None	None
Total Federal investment	3,482,000	84,000	30,000
(2) Non-Federal investment	None	None	None
(b) Annual carrying charges:			
(1) Federal annual carrying charges:			
(a) Interest $3\frac{1}{2}$ percent of Federal investment	121,870	2,940	1,050
(b) Amortization of obsolescence and depreciation (50 years at $3\frac{1}{2}$ percent)	26,570	640	230
(c) Increased cost of maintenance	5,000	1,000	1,500
Total Federal annual carrying charges	153,400	4,600	2,800
(2) Non-Federal annual carrying charges	None	None	None
(3) Total annual carrying charges	153,400	4,600	2,800

43. *Benefits from desired improvements.*—The additional mooring facilities that would be provided by the easterly breakwater extension and shore arm are not now required and no evaluated benefits to navigation can be set up at the present time. The desired bulkhead would relieve the city of Lorain from maintenance and reconstruction costs, but its benefits to general navigation would be negligible. The widening of the bend immediately above the Baltimore & Ohio coal dock would be of material benefit to vessels more than 450 feet in length by affording greater convenience in turning as well as in passing, thus reducing the general hazards of navigation.

WATER POWER AND OTHER SPECIAL SUBJECTS

44. There is no question of water-power development in connection with the desired improvements. No seaplane bases are under consideration, and the work considered in this report is not related to and would have no effect upon conservation of water or soil, malaria control, public health or stream pollution, wildlife or recreation.

SHORE LINE CHANGES

45. No change in the configuration of the shore line would result from the construction of the desired bulkhead or from the river dredging. The desired extension of the east breakwater with shore arm would decrease the shore erosion now taking place to the east of the river mouth, particularly in the vicinity of Lakeside Avenue.

DISCUSSION

46. The extension of the east breakwater and the shore arm, as requested, would greatly increase the winter mooring facilities for lake vessels at Lorain Harbor. Also, the shore line within the breakwater would be protected from erosion, particularly in the vicinity of Lakeside Avenue, where the high alluvial bank has receded to the extent of endangering the avenue at several points.

47. Mooring facilities for lake carriers are now available in Lorain Harbor at present docks as follows: The National Tube Co., 12; the Baltimore & Ohio Railroad Co., 4; the American Shipbuilding Co., 10; and along the river banks between the first two named, in the area known locally as the "Swamps," 6; making accommodations for a total of 32 vessels. Available records show that the maximum number of vessels moored in Lorain Harbor in any one winter was 29 during the winter of 1936-37 and the annual average for the past 10 winters has been 20.

48. Insurance rates on vessels mooring for the winter in outer harbors similar to that desired are appreciably higher than when mooring in sheltered inner harbors. It is considered that the increased insurance charges plus the costs of placing anchors, etc., would more than offset any savings in the usual towing and dockage charges connected with river mooring. Similar outer harbors located at other points on Lake Erie are not utilized by boat operators for winter mooring purposes and the proposed protected area would not be so used so long as the river facilities are adequate.

49. At no time during the navigation or winter seasons do the total number of boats in Lorain Harbor, in service and idle, equal the

available river mooring facilities therefor. Boats not in service and moored at river docks do not appreciably add to the difficulties of river navigation, and therefore such vessels would not be moored in the more exposed outer harbor.

50. The navigation season for Lorain Harbor usually opens the latter part of March, and by the middle of May vessels are in service to the extent that will permit the commencement of maintenance dredging by the United States. Were an outer harbor available to which all vessels not in service could be moved immediately upon the opening of the navigation season, maintenance dredging could be commenced, on the average, about 6 weeks earlier than under present conditions with some resulting benefits to the deeper-draft vessels using the harbor during the early part of the season. However, such benefits would be largely offset by charges for towing idle vessels to the outer mooring area and other increased costs of such mooring previously set forth.

51. The old city dock located between the east river pier and the Coast Guard station is in a deteriorated condition and sections must be removed by the city from time to time as they become a menace to navigation. A gradual caving of the banks, should the city not replace the present bulkhead, will add a negligible amount to annual maintenance dredging costs. A bulkhead at this point could be used at times during the working season for the mooring of Government-owned plant, and the shore for the storage of stone, etc., used for breakwater repairs. However, adequate mooring areas are available for the present and immediate future, and the area at the shore end of the east pier is sufficient to meet the needs for material storage.

52. All vessels using the Baltimore & Ohio Railroad Co.'s coal dock turn at the next upstream bend, preferring the hazards involved there to those involved in making the longer trip to the turning basin at the head of navigation. Widening the river channel at this bend would afford increased convenience and safety to about 110 vessels carrying 1,000,000 tons of commerce annually.

53. A recapitulation of the construction costs and annual costs of the desired improvements follows:

Improvements desired	Construction costs	Annual costs
East breakwater extension and shore arm.....	\$3,381,000	\$153,400
Bulkhead adjacent to east pier.....	84,000	4,600
Dredging above Baltimore & Ohio dock.....	30,000	2,800

CONCLUSIONS

54. Lorain Harbor has adequate mooring facilities to meet the present and reasonably prospective needs of lake carriers. Any extension of the outer harbor would not afford the same degree of protection for moored vessels as the river area and would not be so utilized. Therefore, an extension of the east breakwater as requested, although affording some shore protection, would not be of any material benefit to navigation and is not justified at this time.

55. The construction of a bulkhead between the east pier and the Coast Guard station would relieve the city from removing its old

dock as it becomes a menace to navigation and would reduce annual maintenance dredging costs by a negligible amount should the city fail to maintain adequate bank protection. The construction as requested would be of no appreciable benefit to navigation and is not warranted at this time.

56. The widening of the bend just above the Baltimore & Ohio Railroad coal dock would be of material assistance to vessels turning and loading at that point and is justified at this time.

RECOMMENDATIONS

57. It is recommended that the existing project at Lorain Harbor, Ohio, be modified to provide for a turning basin 20 feet in depth in the bend of the Black River immediately upstream from the Baltimore & Ohio Railroad Co.'s coal dock, as shown on the attached map, at an estimated first cost of \$30,000 and \$1,500 annually for maintenance thereafter, in addition to that now authorized, provided local interests give assurance satisfactory to the Secretary of War that they will hold and save the United States free from all claims for damages incident to the construction and maintenance thereof.

PHILIP G. BRUTON,
Major, Corps of Engineers,
District Engineer.

[First Endorsement]

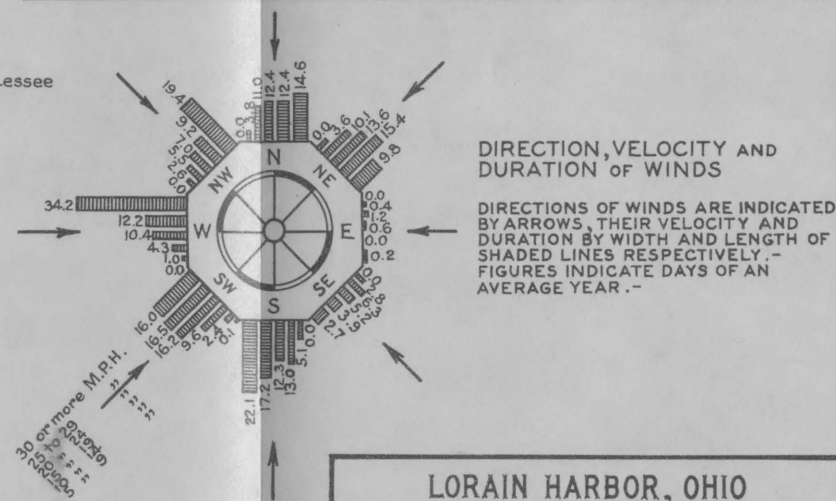
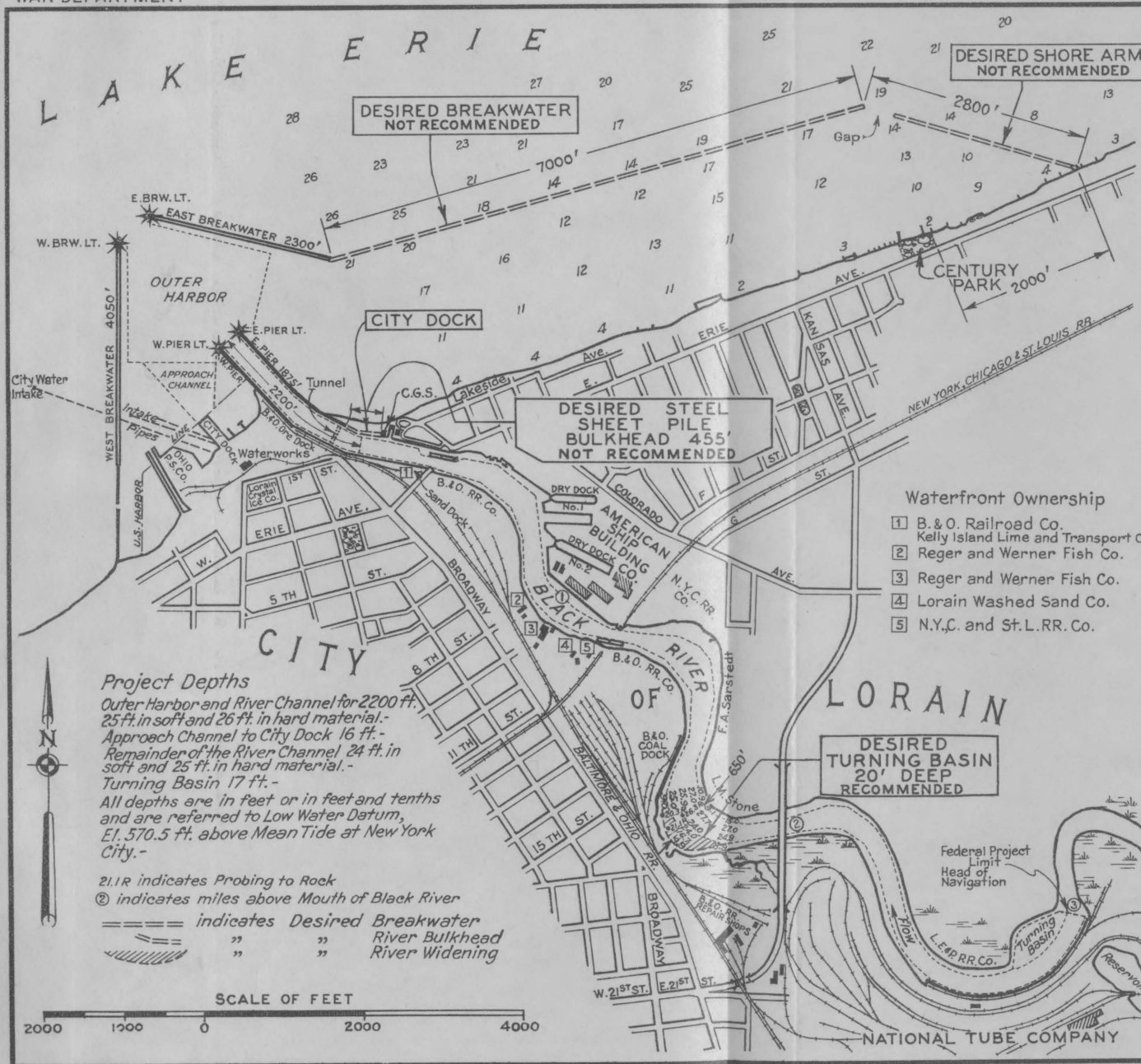
OFFICE, DIVISION ENGINEER,
GREAT LAKES DIVISION,
Cleveland, Ohio, August 15, 1940.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

I concur in the recommendation of the district engineer.

U. S. GRANT 3D,
Colonel, Corps of Engineers,
Division Engineer.

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LORAIN HARBOR, OHIO

In 1 Sheet
 U.S. ENGINEER OFFICE, BUFFALO, N.Y., JAN. 30, 1940
 Submitted: App. Recommended: Approved:
 A. J. Wood H. C. Wood P. J. Wood
 Asst. Engineer Senior Engineer Major Corps of Engineers
 Drawn by P.D.P. Checked by A.J.H. To accompany Review Report
 File No. 7250 (LORAIN HARBOR, O.)-6 dated Aug. 10, 1940